Further Experiments and Observations on the influence of the Brain on the generation of Animal Heat. By B. C. Brodie, *Esq. F.R.S. Communicated to the Society for promoting the knowledge of Animal Chemistry, and by them to the Royal Society.* Read June 18, 1812. [*Phil. Trans.* 1812, *p.* 378.]

In some former experiments it was found, that in an animal from whom the head was removed, the circulation of the blood might be maintained by means of artificial respiration; that under these circumstances the blood underwent the usual changes of colour in the two capillary systems, and carbonic acid was evolved from the lungs, but no heat was generated, and the animal cooled more rapidly than a dead animal of the same size. In the present communication, some experiments are detailed, which were instituted with a view to the further elucidation of this subject.

An apparatus was constructed for the purpose of measuring the air consumed in respiration; and two series of experiments were instituted,—the first to ascertain the quantity of air consumed by animals breathing under ordinary circumstances; and the second to ascertain the quantity consumed by animals which are made to breathe artificially after the functions of the brain are destroyed. It was found, that in animals breathing under these different circumstances, there is little or no difference in the quantity of oxygen which disappears, and of carbonic acid, which is evolved in a given space of time; but that it uniformly happens, that where the functions of the brain are suspended, no heat is generated; and that the animal cools more rapidly than a dead animal.

In another experiment, an animal apparently dead from the poison of essential oil of almonds, was made to recover, by respiration being artificially produced until the poison had ceased to exert its influence. It was found, that while the functions of the brain were suspended, no heat was generated, but that as the sensibility of the animal was restored, the power of generating heat returned.

These experiments, as well as those detailed in the Croonian Lecture for 1810, go far towards proving that the temperature of warm-blooded animals is considerably under the influence of the nervous system; but, what is the nature of the connexion between them? Whether the brain is directly or indirectly necessary to the generation of animal heat? These are questions which, in the present state of our knowledge, must remain unresolved.

On the different Structures and Situations of the Solvent Glands in the digestive Organs of Birds, according to the nature of their Food and particular Modes of Life. By Everard Home, *Esq. F.R.S.* Read June 18, 1812. [*Phil. Trans.* 1812, *p.* 394.]

Since the solvent glands in birds are larger than in quadrupeds, Mr. Home has investigated their structure in different classes of birds, and has here collected several varieties that he has observed;

and his descriptions are accompanied with drawings of various peculiarities of structure.

Of the birds that live on animal food, the author has examined several kinds of falcon, the Soland goose, the crane, the cormorant, the common gull, and the snow-bird, the last of which differs considerably from the rest.

Among graminivorous birds, the swan and goose are noticed as differing from most others in the situation and structure of these glands. Others of this tribe here examined are the turkey, the cassowary, the American ostrich, and the African ostrich. In the three last the solvent glands are in a cavity of unusual size; and the muscular structure of the gizzard is uncommonly weak, which the author conceives to be connected with the mode of progressive motion, which is the same in these birds, and may serve to grind the food without the assistance of strong muscular action.

On some Combinations of Phosphorus and Sulphur, and on some other Subjects of Chemical Inquiry. By Sir Humphry Davy, *Knt. LL.D. Sec. R.S.* Read June 18, 1812. [*Phil. Trans.* 1812, *p.* 405.]

The author has formerly described to the Society two compounds, consisting of phosphorus and oxymuriatic acid, or chlorine; one of them is a solid compound; and by his present experiments, consists of three parts of phosphorus combined with twenty of chlorine. The second compound contains only half this quantity of chlorine, and is a fluid, having the specific gravity of 1·46. The fluid will also dissolve a still further quantity of phosphorus; but the author has not ascertained whether there is any definite limit to the proportion so dissolved.

When this fluid compound is treated with water, it forms a thick fluid, of the consistence of syrup, that crystallizes slowly by cooling. These crystals may be called hydrophosphorous acid; for by heat they are decompounded into phosphoric acid, and a peculiar gas, consisting of phosphorus and hydrogen. This gas differs from common phosphuretted hydrogen, in not being spontaneously inflammable when mixed with common air, and in being considerably less fetid than that gas. The proportions of its constituent parts are estimated to be four hydrogen, with twenty phosphorus. The phosphoric acid contained in the crystals, derived its origin from the water added to the original fluid; while the hydrogen of the water escaped with the chlorine in the form of muriatic gas.

In the interchange of elements which takes place in these combinations, there are many circumstances favourable to ascertaining the proportions in which the several elements unite with each other; and the author observes, the results accord remarkably well with other determinations.

In the same manner respecting sulphur, a similar accordance between the proportions, by weight, in which it unites with different elements, confirms other estimates of the elementary number fit to